



INFECTION PREVENTION IN LONG TERM CARE

Clostridium difficile (*C. difficile*)

Massachusetts Department of Public Health

DISEASE OVERVIEW

C. difficile infection (CDI) is a frequent cause of healthcare-associated infections (HAI) and is currently recognized as the most common cause of infectious diarrhea in long term care facilities (LTCFs). CDI is the cause of over 90 % of cases of pseudomembranous colitis and CDI accounts for 15-25% of all episodes of antibiotic-associated diarrhea. Outbreaks are frequent due to the number of elderly people receiving antibiotics in LTCFs. Even in the absence of an outbreak, the prevalence of *C. difficile* colonization in LTCFs ranges from 4-20%. As CDI is strongly associated with previous antibiotic use, prudent use of antibiotics (antimicrobial stewardship) has a significant role in the prevention and control of CDI in LTCFs.

Risk factors: The reported incidence of CDI has risen over the last decade and is associated with increased morbidity and mortality. Risk factors for CDI include:

- Antibiotic exposure: cephalosporin, clindamycin and fluoroquinolone use are especially associated with increased risk of CDI.
- Prolonged hospital stay
- Advanced age
- Gastrointestinal surgery/manipulation
- Co-morbid illnesses
- Immunocompromising conditions
- Anti-ulcer medications

Infectious Agent: *C. difficile* is a spore-forming, gram-positive anaerobic bacillus that produces two enterotoxigenic exotoxins: toxin A and toxin B. In recent years there has been an emergence of an epidemic strain of *C. difficile*, BI/NAP1/027 which may be associated with more severe disease and increased mortality.

COLONIZATION AND INFECTION

When antibiotics are administered to residents, the normal bowel flora may be affected, which creates a favorable environment for *C. difficile* to reproduce and release toxins, leading *C. difficile* associated disease. There are some important distinctions between *C. difficile* colonization and infection.

- **Colonization:** An individual who tests positive for *C. difficile* with no clinical signs or symptoms of illness. A colonized person is sometimes referred to as a "carrier".
- **Infection:** An individual tests positive for *C. difficile* organism and/or its toxins accompanied by clinical signs and symptoms (watery diarrhea with abdominal cramping and tenderness). Residents infected with *C. difficile* are thought to be more infectious than asymptomatic, colonized individuals.

Both colonized and infected residents may serve as sources for spread of CDI in LTCFs. Since colonization may persist for long periods of time, LTCFs can expect infections with CDI to be a continuing problem.

Mode of transmission: *C. difficile* is shed in the feces and is spread through the fecal-oral route. Transmission occurs when the organism or its spores are ingested. *C. difficile* is primarily transmitted on the hands of healthcare workers, or indirectly via staff or resident contact with contaminated environmental surfaces. Any surface, device, or material (e.g., commodes, bathing tubs, and electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for *C. difficile* spores.

Incubation period: Median 2-3 days.

Diagnosis and testing: CDI should be suspected in any resident with diarrhea. A laboratory specimen for diagnosis is a single, watery, unformed stool specimen (not rectal swab). Stool is tested for the presence of *C. difficile* toxins A and B and for *C. difficile* nucleic acid (DNA). Routine testing of asymptomatic residents is **not** recommended. Formed stool should never be tested.

Treatment: Treatment of CDI should be addressed by the resident's clinician. In approximately 20% of residents, CDI will resolve within 2-3 days of discontinuing the antibiotic to which the resident was exposed. The infection can usually be treated with an appropriate course of metronidazole, vancomycin (administered orally) or fidaxomicin. Relapses occur in about 20% to 25% of residents, but they usually respond to another course of therapy. Some residents experience multiple relapses, making management more difficult. Fecal transplant has been used to restore the normal bowel bacteria and successfully treat CDI in patients with multiple relapses.

INFECTION CONTROL AND PREVENTION

There are several infection prevention and control interventions used to control the spread of CDI in LTCFs. These include: surveillance, standard precautions and transmission-based precautions, hand hygiene, cleaning and disinfection; education of staff, residents and visitors; outbreak control, communication between facilities, administration support and judicious antibiotic use (also referred to as "Antimicrobial Stewardship").

Surveillance: Surveillance is a primary component of all infection control programs and an important measure used to detect outbreaks of CDI within healthcare facilities. A surveillance program should incorporate appropriate and prompt diagnostic testing of residents with antibiotic associated diarrhea or an acute illness with diarrhea not otherwise explained.

- Standardized definitions:
 - Healthcare Facility-Onset: positive specimen collected >3 days after admission to the facility
 - Community-Onset Healthcare Facility-Associated: infection in a resident discharged from the facility ≤4 weeks prior to specimen collection date
 - Community-Onset: positive specimen collected ≤3 days after admission to the facility
- Appropriate and prompt diagnostic testing of residents with diarrhea and acute illness is indicated.
- Tests for *C. difficile* or its toxins should be done only on diarrheal (unformed) stool specimens.
- Testing of stool specimens from asymptomatic residents for CDI is not recommended.

Standard Precautions should be used consistently and at **all** times, by all staff, in LTCFs. Most residents can be cared for using Standard Precautions, with an emphasis on strict adherence to hand hygiene and appropriate glove use. General infection control measures, including standard and contact precautions for healthcare providers can be found at: <http://www.mass.gov/eohhs/docs/dph/cdc/infection-control/general-measures.pdf>.

Contact precautions are recommended for residents with CDI until they are asymptomatic (free of diarrhea) for at least 72 hours. Repeat testing of treated, asymptomatic residents (test of cure) is not recommended. Once a resident is asymptomatic for at least 72 hours, contact precautions can be discontinued and the affected rooms should undergo a terminal cleaning with surfaces treated with a sporocidal disinfectant. Contact precautions with the following specific infection control measures to reduce the transmission of CDI are recommended:

- **Gloves:** All persons entering the room should wear gloves. In addition, gloves should be worn when coming into contact with items that may be contaminated with *C. difficile*, such as clothing, bedding, or environmental surfaces. Gloves alone do not guarantee prevention of transmission. Remove the gloves after caring for the resident, and perform hand hygiene.
- **Gowns:** Gowns should be worn for direct care (bathing or lifting) and when there is contact with secretions/excretions (changing linens). In addition, gowns should be worn when coming into contact with environmental surfaces that are likely to be contaminated. Gowns should be removed and discarded prior to leaving the resident room and hand hygiene performed.

Room Placement: If possible, residents should be assigned to a private room with their own bathroom. If a private room is not available, residents with CDI should be cohorted with other residents with CDI. If multi-resident rooms are used, ≥ 3 feet spatial separation is advised to reduce the opportunities for inadvertent sharing of items between the infected/colonized resident and other residents. Privacy curtains drawn between residents may also promote separation. In LTCFs, decisions regarding resident placement should be made on a case-by-case basis, balancing infection risks for other residents in the room, the presence of risk factors that increase the likelihood of transmission or acquisition, and the potential adverse psychological impact on the infected or colonized resident.

Hand Hygiene: Hand hygiene is the single most effective measure to prevent the spread of all infections. Proper hand hygiene and use of gloves by healthcare workers is the cornerstone for preventing the transmission of CDI. Current hand hygiene recommendations for CDI includes hand washing with soap and water or antimicrobial soap and water, in addition to the use of alcohol-based hand rubs. ***Neither hand rubs or soap and water kill the C. difficile spores***, but the friction of hand washing may be more effective at removing spores. The current Centers for Disease Control and Prevention (CDC) recommendation for hand hygiene in the care of residents with *C. difficile*:

- Non-outbreak settings: Staff should perform meticulous hand hygiene before and after entering the room of a resident with CDI using an alcohol-based hand hygiene product.
- Outbreak settings: Staff should perform hand hygiene using soap and water, or antimicrobial soap and water, instead of alcohol-based hand hygiene products after caring for residents. Ensure that proper hand hygiene techniques are used when hand washing with soap and water is employed.

More information on hand hygiene is available at:

- CDC Hand Hygiene: <http://www.cdc.gov/handhygiene/>
- WHO - 5 Moments of Hand Hygiene: How, When and Why: http://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf

Resident Care Items and Equipment: Resident care items and equipment, such as stethoscopes and blood pressure cuffs should not be shared among residents. If they must be shared, they should be carefully cleaned and disinfected between residents. Only disposable, single-use thermometers should be used with CDI residents.

Environmental Cleaning and Disinfection: *C. difficile* spores can survive on inanimate surface for months resulting in environmental contamination. The heaviest contamination is in bathrooms. Special attention should be given to bedside tables, handrails, call buttons, window sills, light switches, and bedpans/toilets ("high touch surfaces"). Routine cleaning should be performed before disinfection. Although many EPA registered germicides kill the vegetative *C. difficile*, only chlorine-based disinfectants and high concentration hydrogen peroxide formulations kill spores. The use of a 10% sodium hypochlorite solution mixed fresh daily (one-part household chlorine bleach mixed with nine-parts tap water) has been associated with a reduction in CDI. Consider using additional signage in order to ensure awareness of all staff, including personnel responsible for cleaning the environment, as they will need to use an alternative cleaning solution and process. If used, the sign must protect the privacy of the resident and not reveal the diagnosis.

Note: alcohol-based disinfectants are not effective against *C. difficile* and should not be used to disinfect environmental surfaces.

Group Activities: A LTCF is generally considered a resident's home. Residents with CDI should remain on contact precautions and movement restricted until diarrhea has resolved. A resident colonized with *C. difficile* should be allowed to ambulate, socialize as usual, and participate in therapeutic and group activities as long as contaminated body substances are contained. When residents leave their room, they should have their hands cleaned. In addition, they should wear clean clothes. Where appropriate, enhanced barrier protection to contain contaminated body substances is preferred over restriction of the resident.

Outbreak Control: An outbreak may be defined as the occurrence of a disease or condition in excess of what is normally expected. One definition which can be considered with respect to CDI in a long-term care environment is three or more cases of facility-acquired CDI occurring in the same general area of the facility within a period of seven days or less. Each case of CDI in a resident should be closely monitored as previously described. However, the following should also be done in **outbreak** situations:

1. Reinforce infection control procedures throughout the facility. ***Remind staff that alcohol is not effective in killing C. difficile spores, and hand washing with soap and water or an antimicrobial soap and water is required during outbreak situations. Ensure that appropriate bleach or hydrogen peroxide solutions are being used for environmental cleaning.***
2. Increase surveillance for diarrhea among residents and staff.

3. Test all residents who have loose stools or diarrhea. Staff with diarrhea should be excluded from working until they are asymptomatic or a non-infectious cause of their symptoms has been established.
4. Consider single rooms with private bathrooms for residents with CDI or establish a cohort of CDI residents. Staff should be restricted to caring for **only one cohort** of residents. **Restrict floating of staff.**
5. Institute appropriate contact isolation precautions immediately.
6. Depending on the extent of the outbreak, restricting admissions to the facility may be considered while the outbreak is on-going.
7. Notify the MDPH, Division of Health Care Quality at (617) 753-8000 and your local board of health. You should also contact the MDPH Division of Epidemiology and Immunization at (617) 983-6800 for additional advice.

Education and Training: All staff working in a LTCF should receive education and training regarding CDI and the importance of prevention and control. Education should be provided on a regular basis, at least annually. Additionally, in-service training in infection control should be provided in response to any increase in CDI frequency within the facility. When educating staff about CDI it should be reinforced that although healthcare workers are at risk for colonization, healthy people are at very little risk for developing disease with CDI.

Resident, Family and Visitors: Residents, and their families and visitors, should be educated about CDI and the rationale for the types of precautions used by the LTCF. Families and visitors must understand the importance of hand hygiene and should clean their hands before entering and leaving the room of a resident. In addition, families and visitors must have education to alleviate their concerns about CDI, ensure that precautions are maintained, and understand that residents with CDI do not need to be avoided.

Communication with other Facilities: It is essential that LTCFs, hospitals and other healthcare organizations (e.g. home health care and VNAs) work together to control the spread of CDI. Effective communication will ensure that the CDI status of residents is known so that appropriate precautions are implemented in all healthcare settings. Identification of CDI colonization/infection should be noted in the resident's medical record, and notification should be given prior to transfer/travel to another facility. Examples of transfer forms can be found here: http://www.cdc.gov/HAI/prevent/prevention_tools.html.

Administrative Measures: Authorities in infection prevention have strongly recommended administrative support and involvement in efforts to control *C. difficile* in LTCFs. Interventions, such as providing the necessary number and appropriate placement of handwashing sinks and hand sanitizer dispensers, maintaining appropriate staffing levels and enforcing adherence to recommended infection control practices all require the involvement and support of administration. In addition, infection preventionists should:

- Share infection rates and prevention interventions with senior leadership.
- Include senior leadership in communications regarding adherence monitoring.
- Communicate expectation of support and accountability regarding prevention activities to key leadership and provide concrete examples of ways they can support infection prevention and control.

Antibiotic Use and Antimicrobial Stewardship: Because any antimicrobial can potentially induce *C. difficile* disease, stewardship programs that promote judicious use of antimicrobials should be encouraged and complement infection control efforts and environmental interventions. In terms of CDI prevention, antimicrobial stewardship can involve restriction of particular antibiotics associated with CDI and/or decreasing unnecessary use of antimicrobials. LTCFs should develop and institute programs and policies to monitor and control the use of antimicrobials. The CDC's [*Core Elements of Antibiotic Stewardship for Nursing Homes*](#) provides guidance for judicious use of antimicrobials and tools for implementation. This website contains many resources for long term care and focuses on effective antimicrobial treatment of infections, use of narrow spectrum agents, avoiding excessive duration of therapy and restricting use of more potent antibiotics to the treatment of serious infections.

REPORTING RESPONSIBILITIES

Outbreaks should be reported to the Division of Health Care Safety and Quality at (617) 753-8150 during normal business hours and (617) 363-0755 after normal business hours. For further information or assistance with control measures, call the Division of Epidemiology and Immunization at (617) 983-6800.

Information about reportable diseases to the Massachusetts Department of Public Health can be found here: <http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/rdiq/reporting-diseases-and-surveillance-information.html>

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